

APOLLO 8 MISSION CONTROL, 12/24/68, GET 862800, CST 9:19p, 279/1

CAPCOM * during the burn you may notice a slight change in chamber pressure and tank pressures due to the fuel adjust in the storage tank and going to the sump tank. This may occur somewhere around 2 to 5 seconds into the burn. It will be a small change in pressures in both systems. Going down the systems - all systems are go. In ECS we want to stop water boiling after TEI for trajectory purposes. Your water dump situation looks good. You should be good to greater than 105 hours. We'll try to hold off the water dump until after MCC-5. In the EPS we'd like to stir the cryos prior to TLI - correction TEI. The next purge on the fuel cells will occur at approximately 92 hours and that will be both hydrogen and oxygen. Your battery status - battery A 34.9, Battery B 39.1, and Charlie 38.5. We had - we have single fan cryo capability, SCS - looking at the performance of the previous burns you can anticipate a normal burn taking approximately 3.7 seconds of excessory computed value. Engine performance looks nominal, and all primaries have been setting. RCS looks good; all four quads going to the computer programs have approximately the same capacity. You have a good rev map to take you through TEI. You'll have a post TEI PTC edited for you in a few minutes and that just about wraps up what we have on systems. Over.

SC Roger, thank you, Houston. We appreciate the summary. We're trying to get high gain.

CAPCOM Rog.

SC I think we have it. We have the high gain antenna. As I understand it, if it shuts down after 20 seconds of burn, you don't want us to try to realign it, is that what you said?

CAPCOM Stand by. Apollo 8, the intent was do not delay ignitions beyond 20 seconds. Over.

SC Oh, do not delay ignition beyond 20 seconds. Roger.

CAPCOM That's affirmed.

SC Do you want me to start it on Bank A and then switch to C again, as we did on our LOI, right?

CAPCOM That's affirmative.

SC Okay. Did you put in this PAD for us should the P-30 and 40 be in our computer now?

CAPCOM Apollo 8, that's negative. We had not up-linked the SIS Pad. We'll put this one in on the next pass.

SC Okay. Roger.

PAO This is Apollo Control at 86 hours 33 minutes. Part of the information passed up to the crew during that last series of conversations was the information they will use for their trans-earth injection maneuver. This is preliminary information, we do anticipate that it will be

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PAO updated probably on the next revolution. These figures as they were read up to the crew are as follows: the time of ignition is 89 hours 19 minutes and 16 seconds, the burn duration will be 3 minutes 17.8 seconds, that will give us a nominal change in velocity of 3522.3 feet per second, and the maneuver will occur at 174 degrees east longitude and 9 degrees 17 minutes south latitude over the moon. This would give us a nominal return time to earth of 146 hours 49 seconds and we do anticipate to update the burn information prior to the maneuver. At 86 hours 34 minutes into the flight, this is Apollo Control.

END OF TAPE.

PAO This is Apollo Control at 86 hours 48 minutes into the flight. At the present time we have just about 5 minutes before loss of signal and we have had about a minute and a half of conversation with the crew since our last report. We'll play that back for you and then stand by for any parting conversation from the crew before they go over the lunar horizon on this revolution.

CAPCOM Apollo 8, Houston. You have a go for this rev.

SPACECRAFT Roger, Houston.

CAPCOM Apollo 8, Houston, we have completed the tape dump and the recorder is yours.

SPACECRAFT Thank you. Houston how do you read Apollo 8 on OMNIC?

CAPCOM Loud and clear

SPACECRAFT Thank you

CAPCOM Apollo 8, Houston. We're 5 minutes to LOS. We'll have AOS Honeysuckle at 873842.

PAO This is Apollo Control. I would like to clarify one aspect of the figures we gave you concerning that transearth injection maneuver. The return time that was listed ground elapse time of 146 hours 49 minutes 37 seconds was the time in which the spacecraft would nominally reach 400,000 feet altitude. The splash time would be about 14 minutes 10 seconds beyond that and these numbers are close so we will be updated both prior to the transearth injection maneuver and also on route back to earth so we would expect some change in those, some update. We're now less than 2 minutes from loss of signal and we will pick up the spacecraft again at a ground elapse time of 87 hours 38 minutes 43 seconds. At 86 hours 50 minutes this is Apollo Control.

END OF TAPE

PAO This is Apollo Control at 86 hours
54 minutes as the spacecraft went over the horizon and we
lost the signal. Capsule Communicator Ken Mattingly passed
up to the crew a all systems go report. We'll play that
back for you now.

CAPCOM Apollo 8, everything looks good going
over the hill.

SPACECRAFT Roger, Ken. Thanks a lot. We'll see
you around the next pass. Have our TEI update ready for us.

CAPCOM Okay

PAO We expect to reacquire Apollo 8 in
43 minutes 52 seconds. this is Apollo Control at 86 hours
55 minutes into the flight.

END OF TAPE

PAO This is Apollo Control at 87 hours 18 minutes into the flight. Our spacecraft is currently nearing the end of its ninth revolution and the beginning of the 10th. We'll have about 21 minutes before we acquire I would like to pass along some preliminary figures on the acquisition of signal and loss of signal times that we'll have on either side of that transearth injection maneuver. These were passed up to the crew previously. The loss of signal time on the 10th revolution will be about 88 hours 51 minutes and this will be about 28 minutes 5 seconds prior to the transearth injection maneuver. Following the maneuver the signal will be reacquired at 89 hours 28 minutes 39 seconds. This will be about 9 minutes 24 seconds after the maneuver. At this time we have 19 minutes 42 seconds prior to reacquisition of Apollo 8 at 87 hours 29 minutes into the flight this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control at 87 hours 38 minutes into the flight. At the present time our spacecraft is in its 10th revolution and we are standing by for acquisition of signal as Apollo 8 comes over the horizon. That should be in about 15 seconds. The current velocity is 5352 feet per second. And at this point we are at the time when we should be acquiring the spacecraft. We will stand by for a call to the crew or for a message from the spacecraft.

SC Houston. Apollo 8.

CAP COM Loud and clear, Apollo 8.

SC Okay, you want the computer?

CAP COM Apollo 8. We would like to have the high gain and when we get that, well, we will start a dump and we will start your update.

SC Okay, how about reading us the PAD and we will try to get you to high gain. Ken, read us off the PAD in case you can't get the dump in. We can still do it.

CAP COM Roger. I have got them right here. Okay, Apollo 8. The first PAD I have is TEI 10.

SC Go ahead.

CAP COM All right. TEI 10, SPS G&N 455 97 minus 040 plus 157 089 19 1567 plus 351 86 minus 01512 minus 005 20 180 007 000 November Alpha plus 001 86 352 23 318 350 18 42 0924 253 Scorpi Delta down 069 left 45 plus 07 48 minus 16500 12994 363 00 1465005 primary star Sirius, secondary Rigel 129155010 four quads 15 seconds ullage. Horizon on 3.2 degree window line at T minus 3. Use high-speed procedure with minus Mike Alpha. Over.

SC Stand by 1 second. You got the high gain now, Ken.

CAP COM Roger.

SC Houston. Apollo 8. How do you read?

CAP COM Loud and clear.

CAP COM Apollo 8. We would like to --

SC -- TEI 10.

CAP COM Apollo 8. We would like to have you go to POO and ACCEPT and we would like to take the recorder at this time. Then I will copy your PAD.

SC You have got PU and mix up. And you have the recorder.

CAP COM Thank you then.

SC All set for the maneuver.

CAP COM Go ahead.

SC TEI 10. SPS G&N 45597 minus 040 plus 157 089 19 1567 plus 35186 minus 01512 minus 00520 180 007 000 not applicable plus 00186 35223 318 35018 42 0924 253

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SC Scorpi Delta down 069 left 45 plus
0748 minus 16500 12994 36300 146 50 05 Sirius Rigel 129
155 010 four quad ullage 15 seconds horizon on the 3.2 degrees
mark is T minus 3. High-speed procedure minus MA.

CAP COM That is correct, Apollo 8. Would like
to confirm the hours on GEDI 089.

SC Roger. 089.

CAP COM All right, Apollo 8. I have TEI 11 PAD.

SC We are ready, go ahead.

CAP COM Roger. TEI 11. SPS G&N 45597 0 - cor-
rection - that's minus 040 plus 157091 18 1224 plus 36325
minus 01727 plus 01428180003 000 November Alpha plus 001
86 363 94 323 361 86 42 09 95 254 Scorpi Delta down 103
left 48 plus 0742 minus 16500 130 05 363 27 146 51 44
Sirius and Rigel 129 155

END OF TAPE

CAPCOM 4651 44 Sirius and Rigel, 129 155 010
4 quads 15 seconds, horizon on 2.9 degree line at T minus 2
high speed procedure with minus Mike-Alfa, over.

SC Roger, Houston. TEI minus 11, SPS G&N
45597 minus 040 plus 157 091 18 1224 plus 36325 minus 01727
plus 01428 180 003 000 not applicable, plus 00186 36394 323
36186 42 0995 254 R cope by DELTA, down 103 left 48 plus 0742
minus 16500 13005 36327 14651 44 Sirius, Rigel, 129 155 010
4 quad 15 seconds, 2.9 degree with the mark at T minus 2,
high speed procedure minus MA.

CAPCOM That's correct Apollo 8.

SC Houston, could you give me the SPS helium
tank temperature at about 87 20, please.

CAPCOM Okay, stand by one.

SC Roger.

PAO At the present time here in Mission Control,
Flight Director Milton Windler has just checked with his key
flight controllers and we got the report that we look very
good at this time as the pace begins to quicken moving toward
this Transearth Injection maneuver. Included in the list of
numbers read up to the spacecraft and read back down for
verification was the information the crew would use for the
maneuver, the updated information. And checking over it,
we see very few modifications to the preliminary figures we
gave you. One minor change is in the longitude and latitude
at ignition. The previous longitude was 174 degrees east.
That is now updated to 173 degrees 51 minutes east, and our
latitude was 9 degrees 17 minutes south and that has changed
to 9 degrees 20 minutes south. All the other figures appear
to have remained the same. We have a weight at the time of
ignition. That would be 450, rather 45 597 pounds prior to
the maneuver. Following the maneuver predicted weight is
32 124 pounds. The difference there is 13 473 pounds, and
most of that would represent SPS propellant.

CAPCOM Apollo 8, Houston. Our loads are in and
verified. The computer is yours.

SC Roger, Houston, Apollo 8.

CAPCOM Apollo 8, Houston. At 87 48, we're reading
84 degrees, and at LOS we had 80. We'll take a look at the
tape and see if we can find out what we had on the back side.

SC Roger.

CAPCOM We loaded your CSM and LM nav and external
DELTA-V in that order.

SC Roger. Okay, I would kind of like to
know what I might expect at ignition here at TEI.

CAPCOM Roger, we'll take that off the tape.

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SC Houston, this is 8. I take it you have loaded both state vectors, is that correct?

CAPCOM That's affirmative,

SC Roger.

CAPCOM We loaded you CSM and LM nav and external DELTA-V, in that order.

SC Roger.

PAO This is Apollo Control. Currently our spacecraft velocity is 5 354 feet per second, and our orbit measures 58.8 nautical miles at it's low point. We've got a high point of 63.2 nautical miles above the Moon's surface. At 87 hours 59 minutes this is Apollo Control.

END OF TAPE

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PAO This is Apollo Control at 88 hours
5 minutes. The crew has just been given a GO for the
transearth injection on this revolution. here is how that
sounded.

CAPCOM Apollo 8, Houston.

SPACECRAFT Go ahead Houston, Apollo 8.

CAPCOM Okay, Apollo 8 we've reviewed all your
systems you have a go for TEI. One of the things we would
like to do as soon as you come out on the other side is a
P23. We are checking into your helium pressures now. We're
going to correlate not only the last rev but the previous
rev for the same location and we will have that number for
you in a little bit.

END OF TAPE

PAO This is Apollo Control at 88 hours 20 minutes. At the present time, we are about 31 minutes 15 seconds from loss of signal. And the crew, at this time, is involved in aligning the platform on their guidance and navigation system. Here in Mission Control Center, Flight Director, Milton Windler, has just gone around the room again, pulsing all the flight controllers and in every case the word was go. We have gotten all the necessary information up to the crew at this point that they will need for the maneuver. And at the present time, the mood here in Mission Control Center could best be described, I believe, as one of relaxed confidence. Flight controllers are continuing to over their displays, looking at the systems, getting last minute look at all systems before we lose contact with the spacecraft. And we are again, going back over the figures that have been passed up to the crew, verifying every aspect of this maneuver. And aboard the spacecraft, following the platform alignment, the crew will be pretty much up to date on all the things they need to do for the maneuver. At about 88 hours 48 minutes into the flight, they are scheduled to transfer the Command Module Pilot, Jim Lovell, is scheduled to transfer from the lower equipment bay where he has been doing the guidance and navigation checkout and preparation to transfer from there to his couch. We have had very little communication with the crew since our last report. We have about a minute and a half on tape and we will play that back for you now.

CAP COM Apollo 8. Houston. The tape recorder is yours. I have your PTC attitude.

SC Roger. Go ahead.

CAP COM Okay, PTC attitude will be pitch, 10 yaw 45. This begins at 92 hours. Over.

SC Is that pitch 10 and yaw 45?

CAP COM Affirmative. And looks like that will go with the entry REFSMMAT. Begins at 92 hours. Apollo 8. Would you put your up telemetry to block, please?

SC In block.

CAP COM Apollo 8, Houston.

SC Go ahead.

CAP COM Okay, on the helium temp tanks, that's not recorded on low bit rate, and looking over our tape dumps, most of this stuff we have on the back side there is low bit rate. So we won't be able to get you an exact number but looking at what we have every time we go out of sight and come back over the hill, it looks like you can expect about 82 to 84 degrees as a nominal temperature.

SC Thank you.

END OF TAPE

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PAO This is Apollo Control at 88 hours, 37 minutes. We're now some 13 minutes, 55 seconds from loss of signal. The Guidance Officer has confirmed that the spacecraft at this time is in the proper orientation for the transearth injection maneuver. That - maneuver scheduled to occur at 89 hours, 19 minutes. 16 seconds into the flight. There have been a very few brief comments that has passed back and forth from the ground to the spacecraft. Since our last report, we'll play those back. We'll play those back for you now and then standby for a live conversation with the crew.

CAPCOM Apollo 8, Houston, we'd like to have the tape recorder for about 5 minutes for one last look.

SC Roger, Houston, you're getting it.

CAPCOM Thank you. And I guess we still have a cryo stir ahead of us and we've checked your triple bins and there's no change.

SC Roger. And we're stirring cryos right now.

CAPCOM Thank you.

SC Jim, are you through with the tape recorder?

CAPCOM Standby 1.

SC We're on a maneuver to burn attitude and it's going to make us lose the high gain.

CAPCOM Apollo 8, the tape recorder is yours. We have your double umber update. 890715.87.

SC Roger, copy.

CAPCOM All right. And no change on your AOS time.

SC Say that again, will you Ken?

CAPCOM There's no change on your AOS time.

SC Now what was it?

CAPCOM Okay, with TEI 8 niner 283 niner.

SC Thank you.

CAPCOM Thank you.

PAO At this point, Flight Director Milton Windler has just advised his flight controllers that we are just about 10 minutes now from loss of signal. And recommend that they take a last look at all their displays before there is communication with the crew. We're coming upon that transearth injection maneuver. Currently, the spacecraft is traveling at a speed of 5331 feet per second. Our current altitude is 63 nautical miles and the orbital parameters are 63.2 nautical miles for apocynthion, 58.6 nautical miles for pericynthion. At 88 hours, 42 minutes into the flight of Apollo 8, this is Mission Control Houston.

END OF TAPE

PAO This is Apollo Control at 88 hours 46 minutes. We are now just under 5 minutes from loss of signal. We will stand by for any communications with the crew. As we - as the spacecraft goes over the lunar horizon and we lose touch with them. At the present time, Jim Lovell should be finishing a sextant star check. This will be a verification of the spacecraft attitude for the maneuver. And he will then be transferring to his couch, joining Commander Frank Borman and the Lunar Module Pilot, Bill Anders, who are in their couches at the present time. We will stand by now for any parting communications with the crew.

CAP COM Apollo 8, Houston. We have 3 minutes until LOS. All systems are go. Apollo 8. Apollo 8. This is Houston. Three minutes LOS, all systems are go. Over.

SC Roger. Thank you. This is Apollo 8.

CAP COM All systems are go, Apollo 8.

SC Thank you.

PAO At 88 hours 51 minutes, we show loss of signal with the spacecraft. Our next communications with Apollo 8 should come in about 37 minutes. We are now about 28 minutes prior to our transearth injection maneuver. As the spacecraft went over the horizon, Capsule Communicator Ken Mattingly passed along for the second time the word that all systems are go. And we got a very terse Roger back from the spacecraft. At 88 hours 52 minutes into the flight, this Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston at 89 hours 19 minutes into the flight. We are now less than 30 seconds to the scheduled time of ignition, for the maneuver to start Apollo 8 on its course back to earth. In the last 15 seconds, prior to ignition, the crew will be burning their service propulsion system - rather their reaction control system engines to settle propellants. And here in Mission Control Center, we have just counted down to the burn. We should have ignition at this time. That will be a 3 minute and 18 second burn nominally. It will increase the spacecraft velocity by about 3522 feet per second or some 2395 miles per hour. Following the maneuver, the spacecraft should have a velocity of about 8800 feet per second, some 6000 miles per hour. And here in Mission Control, it is relatively quiet. As it has been since we lost communications with the spacecraft as they went over the moon's horizon. At this point, flight controllers here in Mission Control, as with the rest of the world, now they are waiting. (Pause) Coming up in just a few seconds now, we should have shutdown of the service propulsion system engine on the spacecraft. That should have occurred at 89 hours - or rather will be occurring at 89 hours 22 minutes 34 seconds. Actually, we are just a little less than a minute from that event. And the clock here in Mission Control Center that is counting down to the time when we will re-acquire the spacecraft shows that we have 6 minutes 30 seconds until re-acquisition. At this point, the SPS engine should be shut down and we will now be waiting for the spacecraft to come over the lunar horizon and give us a report on their status. We now show 5 minutes 45 seconds until re-acquisition. (Pause) This is Apollo Control Houston at 89 hours 26 minutes. Flight Director Milton Windler has just advised his flight control team here in Mission Control Center that we have less than 3 minutes now until re-acquisition of the spacecraft and he requested that they monitor their console, get prepared to re-acquire and to get a status from the crew. (Pause) This is Apollo Control Houston. We now show less than 30 seconds until re-acquisition. We will stand by for the first words from the Apollo 8 crew as they come over the lunar horizon. And into acquisition.

END OF TAPE

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PAO We have AOS signal, there is a little bit of a cheer going up among the flight controllers here. We should be hearing from the crew shortly.

PAO Our station at Honeysuckle reports that we do have a radio signal from the spacecraft. Having a bit of trouble locking up at this point, to the point where we can get voice communications from the crew.

CAP COMM Apollo 8, Houston. Apollo 8, Houston. Apollo 8, Houston. Apollo 8, Houston.

SC *Houston*, Apollo 8, over.

CAP COMM Hello Apollo 8. Loud and clear.

SC Roger. Please be informed there is a

Santa Claus.

CAP COMM That's affirmative. You are the best ones to know.

SC Burn status report. It burned on time. Burn time 2 minutes 23 seconds 7/10 plus BGX. Attitude Nominal, residuals minus 5/10, BGX plus 4/10 minus 5/10 BGX plus 4/10 BGY plus 0 VGC Delta VC minus 26.4.

CAP COMM Roger. Apollo flight has -- Apollo 8 reconfirm your burn time please.

SC Roger, we had 2 minutes 23 seconds our -- wait one. Change that to read 3 minutes 23 seconds.

CAPCOMM That's it.

PAO This is Mission Control, Houston. Flight Dynamics Officers says that burn is good.

CAP COMM Say again Apollo 8.

SC I say that at this position you are climbing.

CAP COMM Roger.

SC What's next on the docket?

CAP COMM High gain antenna.

CAP COMM Apollo 8 at the first convenient moment we'd like to have high gain antenna.

SC You've got it. You're on the high gain.

CAP COMM Rog.

END OF TAPE

PAO This is Apollo Control at 89 hours, 51 minutes. And in here Mission Control Center we're continuing to assess the effects of that maneuver and we're just in the process now of playing back the tape data of the burn. Of course that maneuver occurring on the back side of the moon, we were unable to monitor as it occurred. We're now looking at the results we would have seen had we been able to receive communications from the spacecraft as the burn occurred. We just put in a call to the crew. Here is that conversation.

CAPCOM The POO and ACCEPT will update the REF map and I have some backup GDC angles for the new entry REF map.

SC Roger, understand. POO and ACCEPT and you'll give us the new REF maps.

CAPCOM Roger.

SC Okay, Houston, you have the ACCEPT.

CAPCOM Roger. Your backup GDC alignment ROLL 308, PITCH 20 niner, YAW 357. Over.

SC Roger, all right what set of stars?

CAPCOM That's on Sirius and Rigel.

SC Understand ROLL 308 PITCH 209, YAW 357.

CAPCOM That's affirmative, Apollo 8. Good morning Apollo 8, Deke here. I just would like to wish you all a very Merry Christmas on behalf of everyone in the Control Center and I'm sure everyone around the world. None of us ever expected a better Christmas than this one. Hope you get a good night's sleep from here on and enjoy your Christmas dinner tomorrow and look forward to seeing you in Hawaii on the 28th.

SC Okay, leader, we'll see you there. That was a very very nice ride that last one. This engine is the smoothest one.

CAPCOM Yeah, we gathered that, an outstanding job all the way around.

SC Thank everybody on the ground for us. It's pretty clear we wouldn't be anywhere if we didn't have them doing it or helping us out here.

CAPCOM We concur that.

SC I concur too. Even Mr. ^Kraft does something right every once in a while.

CAPCOM He got tired of waiting for you to talk and went home.

SC Okay.

PAO This is Houston. Our capsule communicator in that last exchange was astronaut Donald K. Slayton, Chief of Flight Crew Operations here at the Manned Spacecraft Center. Shortly after we acquired the spacecraft and established communications with the crew. Here in the

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Control Center our big display up in the front changed
from a lunar map to an earth map and the colors on it are
red and green. We also had a Christmas tree brought in
and it's now standing down in front of the Control Center.
It looks like it stands about 6 feet tall and it's decorated
with lights and ~~tens~~²¹ and with a big blue ornament on top.

CAPCOM Apollo 8, Houston.

SC Go ahead, Houston.

CAPCOM Okay, the computer is yours. And I
guess we have an IMU alignment and a P23 on the sch-
edule.

SC Okay, thank you. Do an IMU align-
ment coming up. CM in black.

CAPCOM Roger.

END OF TAPE

CAP COM Apollo 8. Houston. We would like to have your zero optic switch prior to beginning P52.

SC Roger. We are going to see if we can find some stars here before we do this P52.

CAP COM Roger. And got a couple of words for you. Jack's been watching you since LOI and he has a few words he wants to give you.

SC Go ahead.

CAP COM Typhoid Jack here and we have got some good words here that originated at the Cape with a bunch of friends of yours and it's sort of in a paraphrase of a poem that you are probably familiar with. Do you read me Apollo 8?

SC You are loud and clear Jack.

CAP COM Okay, Twas the night before Christmas and way out in space, the Apollo 8 crew had just won the moon race. The head sets were hung by the consoles with care in hopes that Chris Kraft soon would be there. Frank Borman was nestled all snug in his bed, while visions of REFSMMAT danced in his head and Jim Lovell, in his couch and Anders in the bay, were racking their brains over a computer display. When out of the DSKY, there arose such a clatter, Frank sprang from his bed to see what was the matter. Away to the sextant he flew like a flash to make sure they weren't going to crash. The light on the breast of the moon and jagged crust gave a luster of green cheese to the gray lunar dust. When what to his wondering eyes should appear, but a Burma Shave sign saying "Kilroy was here". But Frank was no fool, he knew pretty quick that they had been first, this must be a trick. More rapid than rockets, his curses they came. He turned to his crewmen and called them a name. Now Lovell, now Anders, now don't think I'd fall for that old joke you've written up on the wall. They spoke not a word, but grinning like elves, and laughed at their joke in spite of themselves. Frank sprang to his couch, to the ship gave a thrust and away they all flew past the gray lunar dust. But we heard them explain ere they flew around the moon, Merry Christmas to earth, we will be back there real soon. Great job gang.

SC Thank you very much. That was a very good poem. But in order to win the race, you have got to end up on the carriers.

CAP COM We will see you there.

SC Hey, Jack. You really got Bill trained. Okay.

CAP COM I certainly hope so. You did pretty

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CAP COM well Jim. You must have talked on the
way out there.

PAO That rendition of the Night Before Christ-
mas was read up to the crew by Astronaut Harrison Schmidt.
Jack Schmidt, who worked with Lovell quite extensively prior
to the mission and going over the lunar sightings and photog-
raphy that he would do at lunar orbit. At 90 hours

END OF TAPE

ok, Schmidt says?

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PAO At 90 hours 3 minutes into the flight,
this is Apollo Control.

END OF TAPE

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PAO This is Apollo Control Houston at 90 hours 18 minutes. Our displays here in Mission Control are now beginning to show the effects of that transearth injection maneuver. We show an altitude above the moon at this time of 2802 nautical miles. Our spacecraft velocity is 6050 feet per second. And slowing. And our weight following that maneuver is now 32,180 pounds. Onboard the spacecraft at the present time, the crew is finishing up some last minute activities connected with onboard navigation and then they plan to get a little bit of rest. Frank Borman is scheduled to be in a sleep period at this time. And we have had some indications from the crew that Lovell and Anders also hope to get a little bit of rest as soon as possible. We have some brief conversations with the crew that we recorded since our previous report. We will play those back for you now and then stand by briefly for any live communications with the spacecraft.

SC Houston. This is Apollo 8.

CAP COM Go ahead.

SC Roger. We got an alignment with with your new REFSMMAT now. It's on the program here. You want us in P23 and then what?

CAP COM Looks like sleep is coming up.

SC That's what I wanted you to say. We used up the gimbal angles of 10 and 45 with the - this REFSMMAT, right?

CAP COM Affirmative.

SC Okay.

CAP COM Apollo 8. Houston.

SC Go ahead Houston. Apollo 8.

CAP COM Roger. Notice that you are starting on your P23 which is the last scheduled activity. Initial tracking looks like the initial midcourse may be less than 4 foot per second on the first guess. And we have looked at your burn data and it's all just as smooth as you said. Everything on there looks real nominal. Systems now look good. Looks like in PTC attitude, we should be able to switch omni's for you if you would like to do that. We were having good success with predicting on the way out where to switch the antenna. And if it will help you any, we can do that on the way back in.

SC That would be nice if you could do it because we will keep one man in the shop to watch the gimbal angles, but if took - switched the omni's, it should save us a lot of problems.

CAP COM Okay, we will do that. When you get in

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CAP COM the PTC attitude, we will let you know
when we take the command on the antenna switching.

SC Okay. Just be careful what you do with
the tape recorder. ~~Bill's a little sensitive about that.~~

CAP COM Roger. We were listening to the tape
dumps and looks like Bill gets a happy new year after all.

SC ~~A happy new year. How come, Jack - an~~
in joke?

CAP COM No we got that off of his tape dump. He
and Jim were discussing that one.

SC Oh yes, that is right.

END OF TAPE

PAO This is Apollo Control at 90 hours, 50 minutes into the flight of Apollo 8. At the present time our spacecraft is at an altitude above the moon of 4504 nautical miles and traveling at a speed of 5645 feet per second. We've heard very little from the crew since our last report. We do have a couple of brief fix changes on tape. We'll play those back to you and standby for a conversation.

SC Houston, are you getting all this data from P23? Houston Apollo 8.

CAPCOM Go ahead, Apollo 8.

SC I wanted to know if you getting the data for P23?

CAPCOM That's affirmative.

SC Okay.

CAPCOM Ureka.

PAO This is Apollo Control. We're expecting Capsule Communicator Ken Mattingly to put in a call to the crew shortly. While we wait for that, we'll pass along some information that we have been requested to gather, also some additional information on the results of transearth injection maneuver. The transearth injection burn occurred on time. It lasted for 3 minutes and 23 seconds. We had originally estimated that it would last about 3 minutes, 18 seconds. We obtained almost precisely the amount of velocity change from that burn that had been planned. The figure that we have at this point is a velocity change of 3522.8 feet per second. We've been shooting for 3522.3 feet per second. So we would have only have been off about 5/10 of a foot per second. As a result of that maneuver, our current figure is that splash will occur in the mid Pacific at 147 hours, 4 minutes, 59 seconds. That's a very precise figure and I doubt if it will continue to hold true through the post phase and trajectory analysis that will be done on route back to earth. We do anticipate that figure will change. Coming up at 100 hours, 47 minutes, 47 seconds GET, we will be going through the change in the sphere of influence. This will be the point where the moon's gravity ceases to be the dominant influence on the spacecraft. It will also be the point at which the spacecraft will reach its minimum and earth velocity and then start to accelerate toward earth. This will occur at an altitude above the moon of 33821 nautical miles and at that point will be 175528 miles from earth. The velocity at that point will be 4839 feet per second with respect to the moon. And it will be 4106 feet per second with respect to earth. We're also requested to pass along some figures on altitude and velocity at the beginning of the transearth injection maneuver and at the end of that maneuver. At the beginning of

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the maneuver, our velocity was about 5350 feet per second and following the maneuver our velocity was 8841 feet per second. Our altitude at the beginning of the transearth injection maneuver was 60 nautical miles above the surface of the moon. And at the conclusion of that maneuver, 3 minutes and 23 seconds later it was 66.5 nautical miles. At the present time our altitude above the moon is 4876 nautical miles and our velocity is 5587 feet per second and continuing to decrease very gradually. We are still anticipating sometime in the near future a call to the crew and we will pick back up again when that call comes through. This is Apollo Control at 90 hours, 58 minutes into the flight of Apollo 8.

END OF TAPE